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BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE NEWS LETTER

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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

NEWS LETTER

FOR MAY 1937

Vol. IV, No. 7 (Not for publication) July 1, 1937

INFESTED FOODS SEIZED

The Federal Food and Drug Administration in a press release on June 4 reports that, as a result of emergency fumigation during the maritime strike on the Pacific coast, 9,340 shipping cases of raisins contaminated with hydrocyanic acid gas were rounded up. With the reestablishment of normal operations in the shipping industry, says the Food and Drug Administration, the danger to the consumer from poisons of this sort has been eliminated.

Insect infestation caused the following seizures: 22 cases of canned huckleberries and 720 pounds of frozen huckleberries, both wormy; 300 pounds of wormy and rancid pecan meats, 25 pounds of dried peaches and 250 pounds of dried prunes, insect infested, 104 cases of tomato puree containing worm particles; and 509 cases of catsup with worm particles.

RED SCALE PARASITE INTRODUCED

Seven minute parasites (*Habrolepis*), which are definite enemies of the red scale that infests citurs orchards in California, have been received at the Citrus Experiment Station at Riverside, according to a recent announcement by L. D. Batchelor. They come from the citrus districts of South Africa, having been discovered and sent here by Harold Compere, entomologist at the station, who was sent to South Africa at the expense of the organized citrus growers of California. "Citrus growers should understand that this parasite is just a 'promise' of a biological control for red scale", said Harry Smith. "As yet we have no evidence that it will ever become an adequate control. Naturally we hope it will completely control this costly pest. It will take us probably a couple of years to find out." (California Cultivator, May 8, 1937.)

AIRPLANE DUSTING

J. H. Currie, author of "Air Raid on Pests" in the Farm Journal for July 1937, says: "It is on the Pacific coast that airplane dusting has been most widely used * * * Hard as it is to get actual figures showing acreage dusted or sprayed, a report of the California Department of Agriculture shows that over 100,000 acres were dusted or sprayed by plane in California in 1935. Authorities agree that this acreage was increased in 1936 * * * Better equipped planes and better trained personnel have greatly assisted in reducing costs, until in many sections they now compare favorably with ground dusting. The latest planes used in this work are built specially for dusting or spraying * * * Some of the new planes carry from 500 to 1,100 pounds of dust, depending on the altitude and type of landing field used. It requires from 8 to 50 pounds of dust to cover an acre, depending on the crop. Liquid sprays are harder to apply than dusts, but recent improvements in atomizers are making them much more popular * * * Custom work, most of it is. A California operator recently told me that he charged from 3 to 3½ cents a pound to apply dusts and from 23 to 30 cents per gallon for spray. The farmer usually supplies the insecticide and hauls it out to the landing field."

FRUIT INSECT INVESTIGATIONS

Laboratory closed at Wooster, Ohio.--The work of the Bureau on the insecticidal value of oils, carried on in cooperation with the Ohio Agricultural Experiment Station at Wooster, has been discontinued. In the oil investigations certain products which are of promise in the control of scale insects were developed.

Field headquarters established at Salisbury, N. C., for Japanese beetle work.--Field headquarters for studies of the Japanese beetle in the outer zone of spread, with James F. Cooper in charge, have been established at Salisbury, N. C. The work will relate to isolated infestations and to the factors influencing establishment, increase, and spread in that general area. Temporary laboratory space has been arranged for in the courthouse at Salisbury.

Ethylene dichloride more effective against peach borer in winter.--The results of experiments just completed by Oliver I. Snapp and J. R. Thomson of the Fort Valley, Ga., laboratory, show that ethylene dichloride emulsion is more effective against Conopia exitiosa Say and less toxic to peach trees when used during cold weather. Although good results were obtained from the fall applications, better results were obtained from applications made during the winter. The winter experiments also showed that pouring ethylene dichloride emulsion around the base of the tree is equally as effective and in some cases more effective than applications made with a sprayer. The method appears applicable to orchard trees of all ages, as well as to nursery stock in the row and dug nursery stock in bundles heeled in in an upright position. The quantity needed for effective results ranges from ¼ pint of 5-percent emulsion on nursery trees to ½ pint of 25-percent emulsion on 7-year-old trees.

Dried fruit beetle in soil.--Dwight F. Barnes and Charles K. Fisher, of the dried-fruit insects laboratory at Fresno, Calif., examined 733 samples of soil from 3 fig plantings during the period February 10 to April 20, to determine the population of *Carpophilus hemipterus* L. In an orchard of the Mission variety the population decreased from 924 per tree (about 46,200 per acre) on February 10 to none on March 30. The decrease in an Adriatic planting was from 1,775 per tree on February 10 to none on April 20. The reductions appear to be caused by long exposure in cold wet soil (specific cause unknown) and, during March and April, by transformation and emergence. Larvae and pupae, but no adults, were recorded. The Shirck soil washer was used to remove the insects. In another Adriatic planting, in which waste fruit had been cleaned up last fall, the population was very small, in contrast to the condition 1 year before in the same location, where waste figs on the ground had been abundant following the harvest of 1935. This appears to demonstrate that orchard sanitation following harvest will reduce the population of the dried fruit beetle which passes the winter in the soil.

MEXICAN FRUIT FLY

Clean-up work completed in lower Rio Grande Valley.--The number of adult *Anastrepha ludens* Loew taken in traps decreased noticeably during May. A total of 878 adults was taken in traps. All but 21 of these, however, were trapped before the middle of the month. Fruit fly larvae were collected from 49 properties during the tree-to-tree inspection. With the exception of a very few properties needing rechecking, all of the clean-up work is completed and no fruit susceptible to infestation is known to exist within the lower Rio Grande Valley. The taking of the 1937 citrus census is now in progress. A total of 1,229 adult fruit flies and a total of 318 larvae, or a grand total of 1,547 adults and larvae, were taken in May on the Texas side of the Rio Grande. The numbers of each species are shown in the following table.

Species	Adults trapped	Larvae collected
A. ludens	878	318
Premises	182	49
A. serpentina Wied	3	--
Premises	3	--
A. sp. "Y"	1	--
Premises	1	--
A. pallens Coq	347	--
Premises	108	--

CEREAL AND FORAGE INSECT INVESTIGATIONS

Select strains of alfalfa resistant to pea aphid.--L. G. Jones, Sacramento, Calif., reports that, in the seasonal tests made in 1937 in the Antelope Valley in contrasting the aphid populations based on the total number of aphids on 100 plants selected at random in samples of 25 plants from 10 commercial fields with samples from resistant and susceptible plants from 2 test plats, it was noted that the resistant plants had a low population throughout the observation period and that the percentage of increase on resistant plants was not consistent, although the population on susceptible plants grown in the plats compared favorably with the population counts in commercial fields. It is thought that most of the aphids found on the resistant plants were migratory, making the population recorded from these plants unstable and ephemeral. The table below shows the results obtained in commercial fields and in test plats on the basis of total aphids per 100 plants in Antelope Valley in 1937.

Date	Commercial fields		Test plats			
			Susceptible		Resistant	
	Plants examined	Average aphids per 100 plants	Plants examined	Average aphids per 100 plants	Plants examined	Average aphids per 100 plants
	Number	Number	Number	Number	Number	Number
January 26	250	916	50	220	50	44
February 24	250	331	50	96	50	8
March 17	250	657	50	210	50	32
March 30	250	1,194	50	1,048	50	24
April 16	250	7,986	50	6,950	50	50
April 29	250	15,138	50	14,160	50	198
May 27	250	48	50	32	50	2

Factorial analysis of inheritance of alfalfa resistance to pea aphid awaits confirmation.--L. G. Jones, Sacramento, Calif., reports that, in the crosses of resistant and susceptible strains of alfalfa to the pea aphid the 500 F_2 progeny that have been used in tests to date showed that from 21 to 23 percent of the plants were susceptible. The failure of this group to reach the expected 25 percent, together with the fact that a higher percentage of the plants reacted resistant than was expected, precludes any positive statement on the factorial make-up of the resistance. The testing of F_3 rows in 1937-38 will establish the number of factors involved.

Appearance of pea aphid in Kansas.--W. T. Emery, Manhattan, reports that the pea aphid has recently appeared in numbers in alfalfa fields in the vicinity of Manhattan. This species was destructively abundant in alfalfa fields in Kansas in the spring of 1934, but unfavorable climatic conditions reduced its numbers until in 1936 extensive sweepings failed to take a single aphid. Specimens were first taken this year on April 17 on flight screens used to check the migration of chinch bugs. They were swept in numbers from alfalfa fields on May 6.

Behavior of third-year grubs varies with locality.--T. R. Chamberlin, C. L. Fluke, Lee Seaton, and John A. Callenbach, Madison, Wis., report that third-year grubs remained deep in the soil during the month in the sample pastures at Lamont and Gays Mills, but at Leeds, in Columbia County, Bristol, in Kenosha County, and at various places in Dane County, third-year grubs came up and in some areas caused considerable injury to lawns, strawberries, and pastures. This difference in behavior is not due to the species concerned, because at Gays Mills where the grubs are down and at Leeds where they are up the species are largely *Phyllophaga rugosa* Melsh. and *P. fusca* Froel. At Lamont the grubs for the most part are *P. hirticula* Knoch. It is believed that the differences in feeding conditions last year may have been responsible for the variable behavior this year. According to Mr. Fluke, third-year grubs have not been found in southern Wisconsin feeding near the surface in the last 7 or 8 years.

Flight of June beetles in southern Wisconsin.--Messrs. Chamberlin, Fluke, Seaton, and Callenbach also state that the weather in May was in many respects similar to that of May 1935; consequently flight of the beetles began rather slowly and, if present conditions continue, may be expected to persist throughout June. The following species were taken in May: *P. fusca*, *P. hirticula*, *P. rugosa*, *P. ilicis* Knoch, *P. tristis* F., *P. nitida* Lec., *P. marginalis* Lec., *P. anxia* Lec., *P. prunina* Lec., *P. drakei* Kby., *P. implicita* Horn, *P. spreta* Horn, *P. villifrons* Lec., *P. futilis* Lec., and *P. balia* Say. *P. hirticula* predominated at Lamont, *P. rugosa* at Gays Mills, and *P. fusca* in the other areas studied. Only a single male specimen of *P. spreta* was taken. This was from butternut at Gays Mills. Only a male and a female of *P. villifrons* were taken. These were from surface trash at Madison and were the first specimens of this species taken by this laboratory.

The grasshopper situation in California.--C. C. Wilson, Sacramento, says that the outbreak of grasshoppers in 1937 has been largely confined to San Diego and Imperial Counties in the south and to Siskiyou and Modoc Counties in the northern part of the State. The decrease elsewhere within the State may be attributed to three factors: The timely application of poisoned bait in 1935 and 1936, the large number of grasshoppers devoured by parasites and predators, and the effect of climate. In the coastal area the systematic and persistent use of poisoned bait during the early nymphal stages appears to have been the major factor. However, on many egg beds (survey of 1936), Bombyliidae and Meloidae played an important part in this reduction, often attacking over 50 percent of the eggs deposited. An examination on May 28, 1937, in Imperial County, showed 40 percent of the eggs to have been attacked by a hymenopterous egg parasite of an undetermined species. Although climate is a recognized factor in the abundance of grasshoppers, the effects of adverse conditions have received but minor attention. In 1936 an exceedingly dry fall in the Sacramento and San Joaquin Valleys caused many adults to die prior to oviposition. This fact is reflected by a light infestation in 1937 and no serious migration this season is anticipated. A high precipitation, 8 to 10 inches above normal, has occurred throughout the coastal area from Monterey to San Diego Counties, which has in some instances flooded oviposition beds, on many of which hatching has not occurred; and since ample green vegetation is present in the natural habitat of grasshoppers, grazing and meadow land, no serious invasion into cultivated crops in anticipated.

The value of birds in grasshopper control.--Mr. Wilson also states that in San Luis Obispo County further study of the effect of birds in the reduction of the grasshopper population showed for the western crow, 15 per bird, with a maximum of 28 pairs of grasshopper mandibles; for Brewer's blackbird, 12½ hoppers per bird; for lark-sparrow (nestling), 12 hoppers; for California horned lark, 1½ hoppers each. The horned lark, crow, and blackbird were more numerous on the area studied, and the crow and blackbird may be considered a definite factor in the reduction of grasshopper population in May and June. These observations were made in cooperation with Johnson A. Neff, of the Bureau of Biological Survey.

Effects of fumigation on Mediterranean flour moth.--R. T. Cotton, Manhattan, Kans., reports that tests on the comparative toxicity of the common fumigants to the Mediterranean flour moth indicate that the vapors of chloropicrin, although not highly toxic to the egg stage, are remarkably effective against the adult stage. A dosage of less than 1/2 ounce per 1,000 cubic feet of space gives a 100-percent kill in 1 hour, at a temperature of from 72° to 76° F. This represents a toxicity of nearly double that of HCN under the same conditions. Since the fumigation of compact commodities under warehouse conditions is difficult and expensive, it would seem probable that occasional treatments with light dosages of chloropicrin would be useful in holding down warehouse infestations of *Ephestia* moths.

Strains of grass resistant to hessian fly attack.--According to E. T. Jones, Manhattan, recently completed greenhouse tests to determine the relative susceptibility of 22 strains of 11 species of grasses of the genus *Aegilops*, showed that 13 strains were susceptible to development of the hessian fly. Two strains each of *A. cylindrica* and *A. ventricosa* were found resistant to fly development. Listed in order of increasing susceptibility, with a range of 21-percent infestation for *A. cylindrica* WN. 2433, to a 76-percent infestation for *A. ovata globosa*, the susceptible strains are: *A. cylindrica* WN. 2433, *A. crassa rubignosa*, *A. trioristata* ss *recta*, *A. tauchii* P.Q. 77691, *A. ovata* WN 2477, *A. bicornis*, *A. cylindrica rubignosa*, *A. crassa rubescens*, *A. triuncialis* WN 2484, *A. triuncialis nigro albescens*, *A. squarrosa* (Bruner), *A. biuncialis*, *A. columnaris*, *A. ovata* Ks. *glabrous*, *A. trioristata* GH 1934, *A. triuncialis* Ks. *pubesent*, *A. triuncialis* (Tiflis) and *A. ovata globosa*. Ceres wheat checks averaged 38-percent infestation in the tests.

Importations of hessian fly parasites.--C. A. Clark also states that on May 19 a shipment of the hessian fly parasite *Platygaster pleuron* Walk. was received at New York off the S.S. *Berangaria*. The consignment, consisting of 352 adults, was taken to Moorestown in an iced container and placed in cold storage until the following day, when it was delivered to E. J. Udine, of the Carlisle, Pa., laboratory. A second shipment of *P. pleuron*, consisting of 380 adults, was received at New York on May 24 off the S.S. Queen Mary. This consignment was taken to Moorestown in an iced container and delivered on the same day to C. C. Hill, of the Carlisle laboratory. Mr. Hill reported that over 300 of the adults in the May 19 shipment had reached Carlisle alive and in good condition.

Macrocentrus gifuensis Ashm. collected in Massachusetts and shipped to Canada.--Mr. Clark and E. D. Burgess, Moorestown, N. J., report that during the period May 4 to 7 a small collection of corn borer larvae was made at Dighton and Bridgewater, Mass., to furnish a breeding stock of M. gifuensis to the Entomological Branch of Canada. A total of 804 larvae (119 from Dighton section 1 and 685 from Bridgewater section 13 of the 1936 parasite field status survey) were isolated and placed in the incubator at Moorestown. On May 28 a shipment of 98 males and 72 females of the parasite was sent via air express to the Dominion Parasite Laboratory at Belleville, Ontario, Canada. The following day a similar consignment containing 28 males and 55 females was shipped to the same destination, bringing the total numbers of these parasites shipped to 253, of which 126 were males and 127 females. All were reared from the Massachusetts material.

JAPANESE BEETLE CONTROL

Scouting of railroads by autogiro.--On May 21 four two-man scout crews and a supervisor in cars, together with an autogiro and pilot left the Bloomfield, N. J., field headquarters for Montgomery, Ala., where they began the systematic scouting of railroad rights-of-way over which imported burl elm logs moved from ports of entry to Midwestern veneer mills. The itinerary of the autogiro and the follow-up ground crews involves coverage of the Louisville & Nashville Railroad from Montgomery, Ala., to New Orleans, La.; the Southern Railroad from New Orleans to Birmingham, Ala.; the Louisville and Nashville from Birmingham to Montgomery; the Atlanta and West Point Railroad from Montgomery to Knoxville, Tenn.; the Southern Railroad from Knoxville to Birmingham; the Louisville and Nashville from Birmingham to Louisville; the Illinois Central Railroad from Louisville to New Orleans; the Missouri Pacific Railroad from New Orleans to Kansas City; the Missouri Pacific and Pennsylvania railroads from Kansas City to Effingham, Ill.; the Illinois Central Railroad from Effingham, Ill., to Fulton, Ky.; the Baltimore & Ohio Railroad from Fulton to Louisville, Ky,. and thence to Cincinnati, Ohio; and the Norfolk and Western Railroad from Cincinnati to Norfolk, Va. This southern loop comprises slightly over one-half of the 11,665 miles that will be scouted by autogiro. For the 4 flight days of the first week of scouting, the autogiro crew averaged 330 miles per day. The second week the coverage was reduced to an average of 202 miles per day's flight. As the scouting proceeds, location sheets on which wilted elms observed have been spotted from the air are turned over to the various crews at the end of each flight. The ground crews then locate and sample each tree showing characteristic symptoms of the disease. If more than a day is required to locate the elms spotted by the observer, the aerial crew waits for the ground crews to catch up. Flights are made slightly to either side of the railroad rights-of-way to give the observer a vantage point from which all nearby elms are visible. Although the flights will follow closely along the right-of-way, any elm within view of the observer and showing symptoms of the disease will be circled and inspected. At all points where streams or ravines intersect the right-of-way, flight will be diverted to examine any elm concentrations along such offshoots.

Scout-training schools for W. P. A. workers.--Scout-training schools in New York were started in Westchester and Dutchess Counties on May 24 and in Rockland County on May 25. In Westchester County 145 men started training. Of these, 120 had some previous scouting experience. The other 25 are from sanitation crews but are inexperienced in scouting. In New Jersey final instructions were given to county supervisors on May 29 preparatory to the starting of scout schools in all counties in the infected zone. All personnel from the New Jersey sanitation crews will be given scout training. Those who do not qualify will be returned to sanitation work. W. P. A. offices in Bethlehem, Easton, and Doylestown, Pa., were contacted and arrangements were made to obtain men when requisitions are submitted. A tentative selection of a site for the Pennsylvania scout school was made near Easton.

W. P. A. personnel referrals.--From March 11 to May 4 requisitions were placed with the Connecticut W. P. A. organization for 115 men. One hundred and fifty-three men were referred to the State leader for consideration. Of these, 93 were qualified for the work and 66 accepted the assignment. Fourteen of the 66 did not report for work, and 3 quit shortly after reporting, leaving only 49 men to apply on the requisitions. Toward the end of the month the State W. P. A. executive manager of employment interested himself in the personnel situation in Connecticut and ascertained that the difficulty appeared to be with the welfare organizations in that they could not or did not refer the proper type of personnel to our representatives for interview. The manager instructed the welfare directors in Bridgeport and Stamford to have everyone eligible for W. P. A. assignments available for interviewing. The State leader was permitted first choice of any laborers that might be acceptable for Dutch elm disease scouting. Fifteen were selected in Bridgeport and 16 in Stamford, bringing the total W. P. A. personnel in the State to 272. This same procedure will be continued in Danbury and Norwalk, with the expectation that the scheduled quota of 301 men may be reached in time for the opening of the scouting season on June 1.

Typical wilting appears.--The first wilting of elm foliage typical of the Dutch elm disease was observed on May 24 in the town of Patterson, in northeastern Putnam County, N. Y. This tree was noticed by members of a W. P. A. sanitation crew. On May 25 and throughout the remainder of the month, samples from wilted trees were sent in from lower Westchester County and The Bronx by New York State scouts operating in that territory. Wilting trees were found in the town of Goshen, Orange County, on May 26. From the entire infected zone in New York 28 specimens for laboratory culturing were collected during the week ending May 29.

Dutch elm disease publicized in magazine article.--Popular Science Monthly for May devotes two pages to an interesting, popularly written article on the Dutch elm disease. Cuts used to illustrate the article depict autogiro scouting, eradication of a diseased street tree, a cross section of a twig showing streaking caused by the fungus, the use of a chain saw in bucking up logs for burning, coremia of *Ceratostomella ulmi*, and an enlarged photograph of *Scolytus multistriatus* Marsh., the principal insect vector of the disease in this country.

Steel rails protected from gypsy moth infestation.--In southern New Hampshire the Boston & Maine Railroad has started to remove the rails from 16 miles of abandoned track. Gypsy moth infestation along this stretch is very heavy. Eggs started hatching on May 10 while the rails were being torn up. At the behest of the district inspector in that territory, the railroad has agreed to store the rails in a location well removed from any tree growth. As larvae will be unable to survive near the rail-storage piles, the rails may be shipped later without danger of carrying gypsy moth infestation.

Gypsy moth infested shipments.--Infestations, totaling 26 egg clusters, were found on the examination of 13 shipments of quarantined products offered for shipment during the month. With the exception of one egg cluster found on lumber, all infestations were taken from nursery stock.

Fumigation of refrigerator cars.--Several conferences were held during May with officials of the Pennsylvania Railroad and interested growers on the Eastern Shores of Maryland and Virginia concerning the fumigation of refrigerator cars for loading with potatoes. Cars of Eastern Shore potatoes are often loaded and started rolling without a definite destination, to be diverted en route, frequently to points outside the Japanese beetle regulated zone. Until a beetle flight is determined around a particular loading point, certification will be granted for potatoes shipped from that point in refrigerator cars that have been fumigated while empty. Prior to June 15, the effective date of the farm products quarantine, the railroad will send 2,500 refrigerator cars into this territory. After that date the railroad will voluntarily fumigate with hydrocyanic acid gas all refrigerator cars moving into the Eastern Shore. This work will be centered at a switching point near Wilmington, Del. The inspectors who supervise the fumigation will see that all hatches and doors are closed and will attach Department seals to the openings. The seals will not be broken until the car is aired at the loading point. Certificates will be issued for all carloads of potatoes proceeding from Eastern Shore points, irrespective of their probable destination. The cars may thereafter be diverted en route to any market in the country. Should a beetle flight occur at a loading point that would involve hazard of infesting the potatoes while they are being loaded, it will be necessary to fumigate the loaded car. The railroad is also providing cloth screens for the bunker doors that are opened for ventilation while the car is traveling through the infested area. It is anticipated that 12,000 carloads of potatoes will be certified from this area during the season.

Japanese beetle road inspection stations.--Eighteen road-patrol stations were in operation during the month on the principal highways leading from the regulated area. Five posts were located in Virginia, two on the Maryland-West Virginia State line, four in West Virginia, six in Ohio, and one on the Pennsylvania-Ohio State line. An intrastate vehicular inspection service maintained by 4 Pennsylvania State inspectors was in operation on 10 highways leading to the nonregulated area in northwestern Pennsylvania. Three of these State posts were operated on daily schedules, the remaining seven on stagger hours.

Suboffice established in Clarksburg, W. Va.--Classification of approximately 50 nurseries and greenhouses under the Japanese beetle quarantine regulations in the recently added regulated area in Hancock, Harrison, Marion, Monongalia, and Taylor Counties, and the city of Parkersburg in Wood County, has necessitated the stationing of an inspector in that territory. One of the experienced inspectors previously stationed in the Philadelphia district was transferred to Clarksburg on May 21. Desk space has been provided for this inspector in the county agent's office in the courthouse.

Japanese beetle trapping.--By the end of May trapping had been expanded to include Mobile, Ala., Jacksonville, Pensacola, and Orlando, Fla., Athens, Atlanta, Augusta, Savannah, and Toccoa, Ga., New Orleans, La., and Charleston and Columbia, S. C. Not a single Japanese beetle was caught at any of the trapping sites in May. Traps were placed in St. Louis, Mo., but the saturated-bait blocks for these traps will not be exposed until the date of probable beetle emergence for that locality.

FOREST INSECT INVESTIGATIONS

Winter kills southwestern pine beetle broods on Dixie National Forest in Utah.--J. A. Beal, of the Fort Collins, Colo., laboratory, reports that approximately 95 percent of the overwintering broods of Dendroctonus barberi Hopk. infesting ponderosa pine on the Dixie National Forest in southern Utah was killed last winter by abnormally low temperatures. Nearest weather records taken at Panguitch, some 15 miles from the infestation and at a lower elevation than the 8,500 feet at Panguitch Lake near the infestation, showed a minimum of -38° F. on January 9. During January and early February on several other dates the temperature dropped to -20° to -30°. The only surviving broods occur in extremely thick bark ($2\frac{1}{2}$ to 3 inches) at the base of infested trees and may have been protected by snow. Even in this thick bark only an occasional larva survived. Larvae of the Black Hills beetle (D. ponderosae Hopk.) on the Dixie National Forest survived the same temperatures.

Ecological studies of tent caterpillar started.--J. V. Schaffner, Jr., of the New Haven, Conn., laboratory, reports that sample plots were established in East Dorset, Vt., for a detailed study of the natural factors of control of the forest tent caterpillar. Daily records of humidity, temperature, evaporation, and precipitation will be taken during the larval and pupal periods and an attempt will be made to estimate the mortality throughout the season and correlate this mortality with climatic factors. P. B. Dowden, of this laboratory, is collaborating in this experiment by studying the effectiveness of biological control factors. Studies of food-plant preferences of the insect are being conducted. Robert Hunter, a temporary assistant, is stationed at East Dorset to make the daily observations.

Parasites received.--P. B. Dowden and P. A. Berry, New Haven, report that a colony of 569 Leucopis obscura Hal., predator on Adelges piceae Ratz. was received from the Canadian Parasite Laboratory at Belleville, Ontario, on May 5. The flies arrived in excellent condition and were liberated the same day at Grantham, Vt. The infestation at that point is moderate, with a number of trees heavily infested, while several light infestations are present in that general area. Messrs. Dowden and Berry report that one cocoon of Diprion polytomum Htg., collected at Orange, Conn., on October 25, 1936, produced 49 adults of Microplectron fuscipennis Zett. this spring. Several colonies of this parasite were received from the Canadian Parasite Laboratory and were liberated at different points throughout the Northeast in 1936. This represents the first recovery of this parasite in the United States.

Insecticides and forest insects.--S. F. Potts, New Haven, reports that excellent control of the European pine shoot moth was obtained in the field by using concentrated spray mixtures of derris, derris resinate, free nicotine, and lead arsenate. The concentrations were as follows:

Lead arsenate 1 part--linseed oil 0.4 part--water 5 parts
Derris resinate 1 part--linseed oil 0.5 part--water 8 parts
Derris resinate 1 part--linseed oil 5 parts--acetone 2.5 parts
Free nicotine 1 part--linseed oil 5 parts--water 35 parts

Mr. Potts also reports that the sawfly Neodiprion sp. occurring on red pine at Groton, Mass., was treated in the egg and larval stages at the laboratory in a limited number of tests. Red pine shoots bearing several hundred eggs were treated with lime sulphur concentrate at dilutions of 1-10 and 1-20. In both dilutions, 100-percent kill of eggs was obtained. Several hundred larvae hatched in the check experiment and these were divided into 12 lots of 50 larvae each and were treated with lime sulphur as a stomach poison in 1-10 and 1-20, derris (containing 4 percent rotenone) 1-500 and 1-1,000 as a contact spray, derris 1-500 and 1-1,000 as a stomach poison, lead arsenate 2 pounds per 100 gallons, lime 10 pounds per 100 gallons, sulphur 10 pounds per 100 gallons, lime sulphur as a contact poison 1-10 and 1-20, and one check experiment. The results were as follows: Lead arsenate, derris, and lime sulphur in the concentrations used were very effective as stomach poisons. Lime was not effective. Sulphur was fairly effective, but not as effective as the polysulphides of lime sulphur. Lime sulphur, lime, and lead arsenate were not effective as contact insecticides, but derris was very effective as a contact poison.

A pine scale's biology.--Thaddeus Parr, New Haven, reports as follows on the biology of Matsucoccus sp. on pitch pine: "The immature females

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appear never to emerge from the holes in the bracts of the twigs. Crawlers were found emerging from the holes in the bracts through the broken dorsal integument of a legless, immobile female. No mature or immature females have been found on the outside surface of the twigs or on the new growth. No woolly mass has been found inclosing eggs nor have eggs been found at the nodes or elsewhere." A few new places have been added to the known distribution. In Connecticut on a small island near New Haven and on the Pachaug State Forest, in the eastern part of the State, and in New Hampshire at Nashua and Madison.

Cooperative work on cankerworms.--C. W. Collins, of the Morristown, N. J., laboratory, states that members of the laboratory force have cooperated with the National Park Service in spraying for the control of cankerworms at the Morristown National Historical Park. Seventy acres of woodland were sprayed by means of an autogiro. The mixture used consisted of 200 pounds of lead arsenate, 10 gallons of fish oil, 3 gallons of paraffin oil, and 50 gallons of water. On each trip the autogiro carried about 50 gallons of this mixture and distributed it over approximately 6 acres. From visual observations the atomization, distribution, and adherence were very good. C. L. Griswold's observations in the vicinity of Morristown indicate that the spring cankerworm (Paleacrita vernata Peck) is the most abundant species on elm, while the fall cankerworm (Alsophila pometaria Harr.) is most abundant on oak, hickory, ash, apple, wild black cherry, and linden.

Notes on native elm bark beetle.--R. T. Webber, Morristown, reports: "Adults of the native elm bark beetle (Hylurgopinus rufipes Eich.) hiberbate in tunnels which they form in the outer bark of living elm trees. Most of the beetles left their winter quarters and became active from May 10 to May 17, and by May 21 practically all the beetles had left hibernation."

Relation of Dutch elm disease to European elm bark beetle.--H. V. Wester, of the Bureau of Plant Industry, in cooperation with W. D. Buchanan, of the Morristown laboratory reports that it seems to be very important for the coremial stage of Ceratostomella ulmi to be present in the pupal chambers from which Scolytus multistriatus Marsh. emerges, in order for this beetle to act as a vector of the Dutch elm disease pathogene. The experiment consisted of five parts in which the same number of trees and beetles were used (see table following). In part 1 the beetles were removed from pupal chambers in which coremia were present. These pupal chambers were in the bark of C. ulmi-infected logs kept moderately dry. In part 2 the beetles were from the same logs as those in part 1, but they were from pupal chambers where no coremia were present. In part 3 the beetles came from the same diseased source tree as those in parts 1 and 2, but these logs were kept in moist moss. There were no coremia in the pupal chambers. In part 4 the beetles came from logs free from C. ulmi and were checks for the other parts of the experiment. In part 5 the beetles were from the same source as those in part 4, but after the beetles had fed for five days (which was the same for all the beetles in the experiment) a camel's-hair brush containing a C. ulmi spore suspension was brushed on the feeding injuries. When all of the above beetles were cultured, *C. ulmi* was recovered only from those which came from pupal chambers in which *C. ulmi* coremia were present. *C. ulmi* was recovered from only those trees that were fed on by beetles that came from pupal chambers containing *C. ulmi* coremia, and in those trees that had a spore suspension brushed into the injuries. It should be mentioned that *C. ulmi* was recovered only from the wounds made by the beetles.

Source of beetles	Trees	Total beetles making injuries	Beetles transmitting *C. ulmi*	Beetles from which *C. ulmi* was cultured	Total beetle injuries	Beetle injuries from which *C. ulmi* was cultured
	Number	Number	Percent	Percent	Number	Percent
Dry logs infected by *C. ulmi*; coremia in pupal cells (part 1)--	6	10	60	100	14	50
Dry logs infected by *C. ulmi*; coremia not in pupal cells (part 2)--------	6	12	0	0	18	0
Moist logs infected by *C. ulmi*; coremia not in pupal cells (part 3)--	6	10	0	0	16	0
Logs not infected by *C. ulmi* (part 4)--------	6	12	0	0	14	0
Logs not infected by *C. ulmi* (beetle injuries artificially inoculated by *C. ulmi*) (part 5)-------	6	10	--	--	11	54.5

Relation between size of locust borer larvae on north and south sides of tree trunk.--In a study of locust borer activity on the sample plots at Cambridge, Ohio, in May, W. L. Baker, of the Columbus, Ohio, laboratory, observed that larvae on the southern exposure of the tree trunk were more active and perceptibly larger than were those confined to the northern exposures. Beginning May 12 collections were made at weekly intervals from both exposures. The larvae were weighed immediately upon removal from the trees. A comparison of data (see table following) from the two exposures shows a decided difference in the mean larval weight, those from the southern exposure ranging from about 45 to 80 percent heavier than those from the northern.

Date of examination	Northern exposure		Southern exposure	
	Larvae	Average weight	Larvae	Average weight
	Number	Milligrams	Number	Milligrams
May 12-14------	107	5.46	123	8.75
May 19---------	41	6.51	36	11.72
May 26-27------	33	15.61	40	22.55

It is probable that the relative size of these larvae is a pretty fair index of the relative resistance of the two environments to the locust borer development during the early portion of the larval stage. Most of the larvae were in the bark, or cambium, during this period and were directly affected by bark temperatures. In general, prior to May 20 the weather was very cool and humid and only that portion of the tree trunk directly exposed to the sun's rays was favorable for larval development.

Woodpeckers important locally in reducing locust borer populations.--R. C. Hall, Columbus, reports that during the periodic examination of locust borer activity in May it was observed that woodpeckers were very active on all the sample plots at Cambridge. During the examinations early in May, while the larvae were still in the bark, a larger percentage were removed by woodpeckers than late in May, when most of the larvae had entered the wood. On the Cambridge plots over 50 percent of the spring locust borer larvae have been removed by woodpeckers to date. Woodpecker work has been observed at Minerva and Hopedale but in both of these areas only a small percentage of the larvae had been removed. The following table shows the percentage of locust borer larvae removed from trees on the different study areas in Ohio.

Location	Total larvae	Larvae removed by woodpeckers	
	Number	Number	Percent
Cambridge----	1,604	503	31.4
Minerva-------	2,153	116	5.4
Hopedale-----	1,780	50	2.8

GYPSY MOTH AND BROWN-TAIL MOTH CONTROL

Gypsy moth work affected by climatic conditions.--During the first part of May debris on the ground in woodland areas in many localities became exceedingly dry. No burning of brush or debris could be safely done, except on rainy days or immediately after a heavy rain. Midway in the month unusually heavy rains fell throughout most of the area where Federal W. P. A. gypsy moth work was being performed, washing out some of the dirt roads and flooding lowlands. Climatic disturbances for the month culminated with a severe hailstorm, accompanied by high winds, in southern Connecticut, which broke off many tree branches. These will offer ideal locations for the deposition of egg clusters that will be difficult to discover from the ground.

Spraying preparations.--Many of the woodland areas where gypsy moth work will be done this season have been enclosed with fences to prevent animals from entering after treatment has been applied. Many unused roads have been conditioned so that spraying machines can be driven over them and hose lines have already been laid at several of the infestations.

Spraying materials distributed to the field.--Several trucks were kept in constant service during May distributing spraying supplies and equipment from the principal storehouses in Greenfield, Mass., and Wilkes-Barre, Pa. The magnitude of the undertaking is demonstrated by the amount of material moved from Greenfield. During 1 week the shipments consisted of 44,400 feet of 1-inch high-pressure spray hose, 37½ tons of powdered arsenate of lead, 32 barrels of fish oil, and 50,000 yards of 8-inch burlap.

Thinning woodland improves grazing conditions.--Although the primary object of selective thinning of favored food species in woodland areas in the vicinity of gypsy moth infestations is to make the stand more resistant to attack by the insect and to improve it commercially, it has been observed that grazing conditions have materially improved in areas where such thinning has been done in pastured land.

Tractor used to advantage on mountain side.--A caterpillar tractor was instrumental in saving considerable time and labor on a mountain in Massachusetts. The tractor successfully transported a large quantity of barbed wire from the highway to the top of the mountain, a distance of approximately 1½ miles, over a rugged trail. The tractor accomplished in a few hours work that would otherwise have required several days of hard labor.

New spray hose tested before acceptance.--The coupling and testing of 50,000 feet of 1-inch spray hose at the gypsy moth storehouse in Greenfield, Mass., and 20,000 feet at Wilkes-Barre, Pa., has been completed.

Eradication progress at Shawangunk, N. Y.--Federal W. P. A. and New York conservation department employees are continuing the eradication work against the gypsy moth in Shawangunk, Ulster County, N. Y. By the middle of May the combined forces had scouted 12,830 acres of woodland and 60 miles of roadsides, and had destroyed over 27,300 egg clusters. Selective thinning of favored food plants to aid in clean-up operations and make the stand more resistant to gypsy moth attack had been done in an area totaling 78 acres. Burlap bands to trap the caterpillars were placed around more than 14,000 trees.

Elimination work continues at large infestation in Putnam Valley, N. Y.--Nearly 3,200 acres of woodland and over 30 miles of roadsides had been scouted up to May 15 by W. P. A., C. C. C., and State conservation department forces at the site of the gypsy moth infestation in Putnam Valley, Putnam County, N. Y. Over 73,000 egg clusters were destroyed in the course of the work. In addition, selective thinning work was done in 245 acres of woodland and burlap bands were placed around 92,800 trees.

Spraying completed in some residential sections in Pennsylvania.--More than 4,000 permits for gypsy moth spraying were obtained in the Pennsylvania area, mostly in the infested residential districts in the Wyoming Valley. Tree foliage developed to such an extent in these areas that 26 sprayer trucks began operations on May 17. By the end of the month spraying had been completed in the residential sections of the boroughs of Old Forge and Moosic, in Lackawanna County; Miners Mills, Plains, and Wyoming, in Luzerne County; and at the infestation discovered in Hanover Township, in Luzerne County.

Unseasonable mine activities increase inspection work.--An additional gypsy moth inspector was required to examine mine props and laggings cut within the area under quarantine in Pennsylvania. The increase in this type of work was unexpected and unusual at this time of year, for mine operations are normally rather slack during the summer months. To offset this there was a sharp decrease in the inspection of rhododendron and kalmia shrubs dug in the woods within the infested areas. The operators digging these shrubs temporarily suspended work, as conditions were such that they could not assure safe transplanting.

Minor interruptions in C. C. C. gypsy moth work.--There were 938 C. C. C. enrollees working on gypsy moth projects during the last week in May, distributed as follows: Massachusetts 468, Connecticut 190, Vermont 256, and New Hampshire 24. These numbers were slightly lower than those for the previous week, owing in part to the abandonment of camps and partly to the employment of gypsy moth men on other emergency work. For instance, all of the men in one camp in Connecticut were used to complete a road before a certain date; all of the men in one Massachusetts camp spent part of 1 day searching for a man lost in the woods; and all of the enrollees in one camp in Vermont were used during 1 day to seek a lost woman. Such temporary interruptions are unavoidable. During the present fiscal year, up to May 15, over 5,891,000 new gypsy moth egg clusters had been treated by C. C. C. enrollees. Of these, approximately 5,480,000 were creosoted in Massachusetts and the remainder in New Hampshire, Vermont, and Connecticut.

Reduction of C. C. C. personnel means dismissal of many trained men.--The number of C. C. C. enrollees working on gypsy moth projects has recently been materially reduced. Several camps were abandoned in Vermont, Massachusetts, and Connecticut in May. Supervision by this Bureau of the C. C. C. work in New Hampshire has also been discontinued, and the work there is now a State project; however, as the weekly reports from New Hampshire are still being received at the Federal gypsy moth office, the item is being included in the reports. Whenever possible the enrollees trained in gypsy moth work at the abandoned camps were transferred to camps where gypsy moth work is still being done, but not all of the experienced men could be accommodated in this way and many were dismissed.

Effects of abandonment of C. C. C. camps and 45-minute ruling on gypsy moth work.--The abandonment of several C. C. C. camps where gypsy moth work was performed, and the 45-minute ruling limiting the distance from the camps that the men can work, has forced the abandonment of much gypsy moth work that had been planned. It was necessary in some instances to remove burlap bands that had been placed around tree trunks, as it will not be possible to patrol them under the new conditions. In other places arrangements have been made for town or Federal W. P. A. crews to care for burlap, which is on the trees and cannot be tended in any other way.

Progress of the brown-tail moth work.--Scouting for brown-tail moth winter webs was gradually discontinued over the entire infested area during May, as the new foliage developed and concealed the webs.

PLANT DISEASE CONTROL

Susceptibility tests of barberry.--Barberry bushes of various species and varieties at Bell, Md., were inoculated during April with telia of *Puccinia graminis tritici* and *P. graminis avenae* from Pennsylvania and with *P. graminis secalis* and *P. graminis agrostidis* that had overwintered in Minnesota. Since the bushes leafed out irregularly this spring, infection did not include all the species and varieties in the plots. After reinoculation the latter part of April, most of the bushes became infected and the infection was heavy enough to indicate definitely the rust susceptibility of a number of the species. It appears unlikely that further testing of them will be necessary. Studies of seedling bushes at Bell indicated that in most species the bushes hybridize readily with neighboring species and that such hybrids are, in general, susceptible, probably because the number of susceptible species exceeds the number of resistant ones. However, even in lots of seed from such immune species as *Berberis thunbergii* and *B. julianae*, susceptible plants were found. These plants usually differed from the other seedlings in morphological characters also. This is further indication of the fact that seedlings probably will not be truly representative of the type species, either in morphological characters or rust resistance.

Rust observations in Texas and Mexico.--Observations in northern Mexico from April 21 to 25 disclosed that there is more stem rust this year than in 1935 and 1936. By the middle of May stem rust had been found on wheat as far north as northern Oklahoma. Although there was a considerable amount in some wheat-growing areas of Texas, the wheat was approaching maturity so rapidly that it seemed doubtful whether appreciable damage would be done. At the same time there were only traces of stem rust in occasional fields of oats in Texas.

Rust has appeared in Kansas wheat fields.--By the end of May black stem rust could be found in many localities in eastern Kansas, western Missouri, and southern Nebraska. The severity of infection varies considerably in different localities and in different fields, soft wheats in general being most heavily infected. By June 9 there were traces of rust as far north as Sioux City, Iowa. The extent of its future development in the spring wheat region will depend largely on weather conditions.

Other rust notes.--Infection on barberries appeared somewhat late this spring. Bushes became rusted in April in Virginia and West Virginia, and during May in Ohio, Indiana, Michigan, Wisconsin, Missouri, Iowa, and Minnesota. Collections of aecial material from barberries have been obtained from six States, and efforts will be made to identify as many of them as possible. Collections of stem rust of wheat from Mexico and Texas also are being determined. Now in process of identification in the greenhouse at St. Paul, Minn., are 65 or 70 uredial collections and 17 aecial collections. Studies of teliospores of Puccinia graminis during the last fall and winter again indicate that high temperatures during the summer are usually injurious to the spores. Teliospores of P. graminis tritici obtained late last fall from Texas and Oklahoma and early this spring from Missouri did not germinate, whereas collections from Colorado, Kansas, and Minnesota germinated readily. Many of the collections from Minnesota, however, did not appear to germinate as readily and abundantly as in previous years. The sporidia produced by the germinating teliospores will not develop on grain, but only on barberry leaves.

Seasonal Ribes eradication operations started in the North.--During May the number of men employed under the emergency allotments in blister rust control was increased from 1,760 to 2,927. Ribes-eradication work was begun for the spring in all the northern regions and was continued in the southern Appalachian territory, where it had been in progress all winter. Winter work on blister rust control in the Northern States consisted of pine surveys and maps, disease surveys, and canker removal on ornamental and valuable pines on Federal property, such as national parks.

Eradication of European black currant being rechecked in California.--The locations in which European black currants were found a number of years ago in California are now being rechecked. Most of the bushes located thus far have been found on properties where the owners were originally reluctant to part with them and it appears that in some cases there has been either sprouting or replanting of bushes previously dug up.

New pine infections in Wisconsin.--Blister rust cankers on white pine were found for the first time in May in LaCrosse and Brown Counties, Wis. Ribes infection had been reported in these counties in other years. Blister rust has now been reported on white pines from 43 of 71 counties in the State.

Blister rust control under W. P. A. and E. C. W. projects in the Northeast.--Plans for blister rust control in the Northeastern States include the employment of an average of 823 laborers from relief rolls on *Ribes*-eradication work during May and June. In addition, the E. C. W. program from May to September provides 232,505 man-days of labor from a total of 123 C. C. C. camps for similar work in 264 townships. In New Hampshire and Maine local control projects will be conducted in 119 cooperating townships, as a result of town appropriations totaling $25,625.

Ribes-eradication training school in Vermont.--During the week of May 3, a training school for E. C. W. technical foremen (supervisors) in blister rust control was held at the Thetford, Vt., C. C. C. camp. The 13 men in attendance were given comprehensive instructions in the various phases of control work in order that they might later supervise labor from their respective camps assigned to *Ribes*-eradication work.

Nursery sanitation.--Blister rust sanitation projects around white pine nurseries were in operation in all the Northeastern States and in a number of Middle Western, Western, and Southern States. This work maintains *Ribes*-free zones around the nurseries and assures the production of white pine stock which is free from blister rust infection.

COTTON INSECT INVESTIGATIONS

Humidity limits duration of long-cycle pink bollworm larvae.--Studies of the ecological factors limiting the formation and duration of the long-cycle larvae of the pink bollworm have been continued by L. C. Fife at Mayaguez, P. R. In March open cotton bolls containing an estimated quantity of long-cycle larvae were placed on the soil surface under screened cages. In the examinations in April and May, 15.6 percent of the larvae were alive and had not pupated after 36 days, and 19 percent after 68 days. Many dead larvae were found, thought to have been killed by high temperatures, on the soil surface. Laboratory experiments were started to determine the effect of contact moisture on long-cycle larvae in order to evaluate the effect of rainfall on the duration of the resting stage under field conditions. Long-cycle larvae were removed from bolls and allowed to spin up between discs of paper and the bottoms of petri dishes. After they had spun up, the petri dishes were divided into four lots. One lot was moistened daily, another weekly, the third biweekly, and the fourth was left dry as checks. Water was poured into the treated dishes for 3 minutes, then they were allowed to drain. The paper remained wet for about 8 hours but the water did not penetrate the cocoons. Very little difference in the percentage of pupation occurred in the first 30 days of treatment, but after 72 days 70 percent of the larvae moistened daily, 41 percent of those moistened weekly, 40 percent of those moistened every 2 weeks, and 27 percent of those left dry had pupated. In other tests, where larvae were permitted to spin up in absorbent cotton and then kept moistened to different degrees of humidity, pupation was greatly accelerated with increases in humidity. When kept continuously moist and near 100-percent humidity, pupation was completed within 45 days. These results indicate that humidity is the important factor in limiting the duration of the long-cycle larvae under tropical conditions, and that in the field, under conditions of heavy rainfall, pupation and emergence of all long-cycle larvae would be completed in from 45 to 60 days. They also indicate the possibility of practical use in reducing the pink bollworm damage by adjusting the planting date to the distribution of rainfall.

Beet army worm on cotton.--T. P. Cassidy and T. C. Barber report that Laphygma exigua Hbn. again caused considerable damage to cotton in Arizona this year. One of the large cotton growers in the Buckeye district employed two men for the greater part of May to patrol the fields and immediately dust small areas with hand guns. He also bought an 8-row power duster for use where large areas were involved. Calcium arsenate, paris green and lime (1 part to 8 and 10 parts of lime) as dusts, and paris green, 2 pounds in 50 gallons of water, were used. All of these treatments were fairly effective when the worms were small, but in no case were all of the worms killed and the control by arsenicals was not entirely satisfactory. The best control was obtained by immediate irrigation of the cotton as soon as the worms were detected. The irrigation should be applied down the rows and not in the middles, in order to surround and submerge the plants. The water washes many of the worms from the plants, seals many of them under the surface of the soil where they go between feedings, and also revives some of the injured seedlings that would otherwise die. Delay in thinning the cotton plants until danger of attack is past has also aided in obtaining a better stand.

Presquare poisoning for boll weevil.--K. P. Ewing and R. L. McGarr, Port Lavaca, Tex., report regarding presquare boll weevil control tests conducted this year in the Lavaca River bottom near Edna, Tex. Three fields were dusted while cotton was in the presquare stage with from 6 to 8.3 pounds of calcium arsenate per acre, and one field was mopped with from 2 to 2¼ gallons of calcium arsenate-molasses mixture (1 pound calcium arsenate, 1 gallon molasses, and 1 gallon water) per acre. Besides the three three-plot experiments, three entire fields of cotton were dusted with calcium arsenate, one entire field was mopped, and one field left as an untreated check. Before treatment all plots and fields were infested with boll weevils, the numbers ranging from 3 to 33 per 1,000 plants examined. Two weeks after the poison applications were made, less than 1 percent of the squares were infested in eight of the poisoned plots and fields, in one field where calcium arsenate dust was used less than 3 percent of the squares were infested, and in one plot with the same treatment less than 9 percent were infested, whereas in the untreated 12-acre check field the infestation was 50 percent, and in the three 1-acre check plots the infestations were 25, 31, and 46 percent. This indicates remarkable results from the presquare poison treatments this year in southeastern Texas.

Balloons aid in determining the effect of wind on movement of cotton flea hopper.--Mr. Ewing also reports that through the cooperation of F. L. Thomas, of the Texas Agricultural Experiment Station, 4,300 balloons were released in May for the purpose of obtaining information regarding the possible effects winds may have on the movement of insects, particularly the cotton flea hopper (Psallus seriatus Reut.). The balloons and hydrogen for inflating them were supplied by the Texas Agricultural Experiment Station and the serially numbered franked tags were supplied by this Bureau. The 20 counties from which releases were made were selected because they contained large areas of horsemint and croton, the two principal host plants of the flea hopper. From the 1,623 balloons that had been released prior to June 4 in 10 counties around Port Lavaca, 82 tags had been returned by that date. One balloon, released on June 2 at Halletsville, Tex., was recovered the next day at Waldo, Ark., a distance of approximately 375 miles. Another, released at Halletsville at 11:48 a.m. on May 26, was recovered at 5:00 p.m. the same day at Pennington, near Crockett, Tex., after traveling 155 miles in 5 hours and 12 minutes, or 30 miles per hour. Although it is still too early to even estimate the percentage of recoveries that will be made, the average to June 4 from releases made on various dates from May 14 to June 2 was 5.05 percent. The largest number of recoveries from any series of releases made on 1 day from the same location was 14, or 28 percent of the 50 balloons released at Columbus in Colorado County on May 19.

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

Wild-cotton eradication.--The eradication of wild cotton in southern Florida went forward satisfactorily during May. The work was curtailed somewhat because of the necessity of conforming with certain regulations changing some of the crews from an exemption basis to a certified-relief status at security wages and hours. There was also a considerable reduction in the number of laborers used, as the camp at Cape Sable was discontinued the first of the month. A small crew was also discontinued on Marathon Key. At Cape Sable a few small sections that had not been worked were completed by a small crew on May 14. A first clean-up was made on 83 acres, on which 265 mature and 684 seedling plants were destroyed. The recleaning covered 1,948 acres and resulted in the destruction of 69 mature, 80,813 seedling, and 593 sprout plants. At least five new locations of wild cotton were destroyed, this cotton having been located in the autogiro survey. It was a comparatively simple matter for the crews to reach this cotton and destroy it. The eradication program is now getting in very good condition for this season of the year. As crews are discontinued, the trucks and other equipment used are being cleaned and repaired as rapidly as possible, in order to preserve and have them for next season's work.

Thurberia-plant eradication.--The eradication of Thurberia plants in the Santa Catalina Mountains of southern Arizona has also continued to make satisfactory progress. During the month 2,040 acres were covered and 3,665 Thurberia plants destroyed. The small number of plants destroyed is due to the fact that some of the higher sections were worked during the first part of the month. There was little likelihood that Thurberia plants would be found in such places but, in order to cover the territory thoroughly, they had to be worked. Two small forest fires were discovered and put out by members of the crew, who had the fires well in hand by the time the forest ranger arrived.

Laboratory inspection.--Laboratory inspection has been carried on as usual at San Antonio and at practically all of the field stations. The results were negative for all material originating outside of regulated areas; however, one or two larvae were found in material collected in the El Paso Valley.

The situation in the Big Bend.--Early in the season a few farmers in the Big Bend section of Texas indicated that they did not intend to observe the uniform planting date of April 15, or later. In order to be successful, the special control program, which has been in effect since the fall of 1932, must be observed unanimously and, as a few intended to break over, the program was withdrawn in Presidio County. The first cotton was planted on March 17 and plantings continued until May 26. As a result, the oldest cotton is now beginning to fruit, while the latest cotton is only a few inches high. There are also a few stub plants, or new growth put out from last year's roots, on nearly every farm. The latter part of the month a good many infested small squares could be found on these stub plants. It would therefore appear that the worm population will build up in this early planted and stub cotton and result in a heavy infestation this fall unless some unusual condition should arise. In Brewster County the control program is being wholeheartedly observed; however, there is only a small acreage planted to cotton. The control program briefly consists in clean-up of fields and premises in the fall after picking is completed; a uniform planting date of April 15 or later in the spring, so that the majority of moths will have emerged before the cotton begins fruiting; and the use of small trap plots to trap the moths emerging later. A small plot of cotton was planted in Brewster County but, inasmuch as the field cotton was planted considerably after April 15, it was not considered advisable to use the plot. There is always danger of some fruit being overlooked, allowing worms to develop; consequently the plot was destroyed on May 20.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Factors governing curly top infection.--In analyzing the results of a study, made in south-central Idaho, of the beet leafhopper and the curly top disease during the 7-year period 1930-36, J. R. Douglass and his associates at the Twin Falls, Idaho, laboratory, conclude that early spring movements of beet leafhoppers were followed by rapid and widespread curly top infection, resulting in low yields of sugar beets, whereas late spring movements were followed by seasons in which sugar beets escaped serious curly top infection and produced good average yields. The initial infection of curly top appeared usually in the western part of the territory studied and spread from west to east. The percentage of curly top infection of sugar beets in the 1935 and 1936 seasons, during which resistant strains of sugar beets were planted, paralleled that found in the susceptible strains grown during the preceding years 1930-34, through the early part of the season so that a high percentage of total infection was attained whenever leafhopper populations were high, but the resistant strains displayed a marked tendency to recover from the disease during the latter half of the summer, so that good average yields were produced in the fall. A comparison of the acreages of sugar beets planted, thinned, abandoned, and harvested, and the resultant yields per acre, during seasons of high curly top infection with those of low infection, showed that much abandonment of sugar beet acreage occurred during those years when the curly top disease appeared early and spread rapidly, and that low tonnages of beets resulted; whereas very little abandonment occurred in years when curly top infection was late and slow in spreading, and that good average yields were obtained under these conditions. In comparing the average yields of sugar beets in 1935, during which resistant strains were planted, with those of 1930 and 1932, during which susceptible strains were grown, it was shown that high curly top infection reduced the average yield of susceptible beets in 1930 to a point below the margin of profit, and that low curly top infection allowed the production of a highly satisfactory average yield in the same strains of sugar beets in 1932; also, that the resistant strains of sugar beets produced a good average yield in 1935, despite a high infection early in the season.

Insecticides promising against strawberry weevil.--The results of experiments performed by W. A. Thomas at Chadbourn, N. C., against the strawberry weevil indicated that when the weevils cut as many as 15 percent of the flower buds a significant degree of control can be obtained by making from two to three applications of undiluted dusting sulphur, a dust mixture containing 0.5 percent rotenone, with clay as a diluent, or a dust mixture composed of calcium arsenate and finely ground dusting sulphur (1-5) applied at weekly or 10-day intervals during the period when the flower buds are being cut by the weevils. Very thorough coverage of the plants with any of these dust mixtures appears to be essential for effective results. For the duration of the insecticide applications, there were significantly fewer buds cut on the plots receiving the calcium arsenate-sulphur dust mixture than on any of the other plots. In the number of marketable berries produced the plots receiving the undiluted sulphur, the 0.5 percent rotenone, or the calcium arsenate-sulphur dust mixture were significantly better than the untreated check plots. Undiluted sulphur gave slightly better results than either of the dust mixtures. In the weight of marketable strawberries produced the undiluted sulphur and the dust mixture containing 0.5 percent rotenone were significantly better than the check. The calcium arsenate-sulphur dust mixture produced a significantly greater number of cull berries than were produced on the untreated check plots and the weight of the cull berries on these plots was significantly greater than on any of the other plots receiving insecticidal treatment.

Tomato fruitworm fails to survive winter in Utah.--H. E. Dorst, of the Logan, Utah, laboratory, reports that examinations of overwintering cages of *Heliothis obsoleta* Fab. at Logan, Hooper, and Farmington, Utah, have indicated that none of the *H. obsoleta* pupae survived the winter of 1936-37 in that locality. A total of 75 larvae were placed in cages at each of these localities during the fall of 1936 and supplied with sufficient food to enable them to reach maturity before entering the soil. These larvae were given an opportunity to overwinter under very favorable conditions.

High survival of Mexican bean beetle in Ohio and Virginia.--H. C. Mason, of the Columbus, Ohio, laboratory, reports that at the close of May, the data obtained from Mexican bean beetle hibernation cages indicated an average of 32.6 percent survival, and similar data obtained by L. W. Brannon, of the Norfolk, Va., laboratory, indicated a survival of approximately 24 percent in eastern Virginia. This survival of the Mexican bean beetle is much higher than has occurred during recent years.

Handpicking indicated as an effective control of harlequin bug under special conditions.--L. W. Brannon, of the Norfolk, Va., laboratory, reports that the results of an experiment conducted at Norfolk to determine the effectiveness of handpicking overwintering adult harlequin bugs (*Murgantia histrionica* Hahn.) on seed kale as a means of preventing an infestation of this pest on spring cabbage indicate that this method, under the conditions stated, gives practical results. In the course of this experiment an average of 928 *M. histrionica* adults per acre were removed from the seed kale during the period extending from April 14 to June 2, 1937.

Crude naphthalene fairly effective against wireworms at low soil temperatures.--According to a report submitted by R. S. Lehman, of the Walla Walla, Wash., laboratory, recent field tests performed with crude naphthalene as a soil fumigant for wireworms, principally the sugar beet wireworm (*Limonius californicus* Mann.) and the Pacific coast wireworm (*Limonius canus* Lec.), at Prosser and Walla Walla, have indicated that fairly successful results may be obtained by this method, even when the soil temperatures to a depth of 12 inches range from 65° to 67° F. Concentrations of 500 and 800 pounds of crude naphthalene per acre were used. At Prosser the percentage of mortality obtained with these concentrations was 93.5 and 84.2 percent, respectively, whereas at Walla Walla mortalities of 70.3 and 85.7 percent, respectively, occurred.

INSECTS AFFECTING MAN AND ANIMALS

Effects of certain infusions on hatching of mosquito eggs.--H. H. Stage, of the Portland, Oreg., laboratory, has conducted tests to obtain information on the substance or substances that must be present in water before eggs of *Aedes vexans* Meig. and *A. aldrichi* Dyar and Knab will hatch. Several thousand eggs of these species were recovered from soil taken in the field. It was found that pure tap water, vitamin B infusion, and pantothenic acid induced no hatching, while infusions of dead or green leaves, liver, and oats induced satisfactory hatches.

Mosquito control in catch basins.--W. V. King, of the Orlando, Fla., laboratory, reports the following: "The Orlando sanitary department requested advice as to a larvicide to use in place of oil in street catch basins that emptied directly into the numerous small lakes in the city, as it was believed that the oil used in previous years (consisting of excessive quantities of waste crank-case oil) had been injurious to the water fowl, and especially so to the eggs of swans. Upon the suggestion of T. E. McNeel, a mixture of paris green and water was tried on some of these basins and appeared to be so effective that all of the basins in the city (more than 1,000 in number) were given similar applications on two successive weeks. Check examinations in 27 basins, made by Mr. McNeel about 24 hours after treatment, showed 100 percent mortality in 25 of the basins and an average of more than 99 percent for all of them. The paris green was used at the rate of about 1 pound per 100 basins. This method of treatment proved to be somewhat more rapid than oiling; the principal drawback seemed to be that mosquito breeding was resumed almost immediately, the paris green having no effect on the eggs or as a deterrent to oviposition."

Screwworm in Arizona.--C. C. Deonier, Uvalde, Tex., reports that Cochliomyia americana Cushing and Patton has gained entrance to Arizona from Mexico by migration. It is now well established in Pima and Santa Cruz Counties. There are indications that it entered the State earlier in the spring; also, it is probable that Cochise County became infested at the same time as Santa Cruz and Pima Counties.

Screwworm incidence.--A. W. Lindquist, Uvalde, Tex., reports that the number of screwworm cases has increased steadily throughout the month on most ranches near Uvalde. This increase has progressed under very dry conditions with temperatures 1.4° F. (=78°) above average, and winds that were strong and continuous. One man reported 200 cases in 1,000 head of sheep and goats during April and May. Many of the cases in sheep and goats were caused by eating prickly pear.

Houseflies breeding in waste lettuce.--Mr. Deonier also reports that a tremendous population of houseflies has bred up in waste lettuce in the fields of the Salt River district and at Yuma.

FOREIGN PARASITE INTRODUCTION

Hessian fly parasites from France.--During April and May 3 shipments of Platygaster pleuron Walk., totaling 1,089 adults, and 2 of Trichasis remulus Walk., comprising 857 adults, were forwarded from St. Cloud for colonization in the United States.

Sawfly parasite material to Canada.--Continuing work in Japan, in cooperation with the Canadian Department of Agriculture, R. W. Burrell reports the shipment of 138,000 field-collected cocoons of Diprion nipponica Roh. to the Belleville, Ontario, laboratory. This material was collected largely near Mt. Fuji, where the pest appears to be building up after a period of relative scarcity.

FOREIGN PLANT QUARANTINES

Entomological interceptions of interest.--Seventeen larvae and five puparia of the West Indian fruit fly (Anastrepha acidusa Walk.) were collected on December 1, 1936, in 20 grapefruits in the field at Manati, P. R. Forty-three living larvae of the Mediterranean fruit fly (Ceratitis capitata Wied.) were intercepted at New York on March 8 in 17 loquat (Eriobotrya japonica) fruits in baggage from Bermuda. Two living specimens of the pink bollworm (Pectinophora gossypiella Saund.) were taken at Houston, Tex., on February 25 in seed cotton in the mail from Turkey. A living larva of the bruchid Pachymerus nucleorum F. arrived at San Francisco on February 17 in babassu (*Orbignya speciosa*) nuts in cargo from Brazil. A living adult of the scarabaeid *Anomala attenuata* Bates was found at Galveston, Tex., on August 17, 1936, with banana debris in cargo from Honduras. The scale insect *Aspidiotus* (*Aonidiella*) *orientalis* (Newst.) was taken at Baltimore on March 3 on shisham (*Dalbergia sissoo*) seed in the mail from India. The citrus blackfly (*Aleurocanthus woglumi* Ashby) was intercepted at Miami, Fla., on March 24 on an orange leaf in baggage from the Bahamas. Two living larvae of the olethreutid *Crocidosema plebiana* Zell. arrived at Laredo, Tex., on February 12 and 17 in okra in cargo from Mexico. Living specimens of the scale insect *Chionaspis yanonensis* Kuw. were intercepted at San Pedro, Calif., on February 12 on oranges in ship's stores from Japan. H. Morrison reports that this species also goes under the generic name *Prontaspis* and that there is no record thus far of its occurrence in the United States.

Interesting bruchid from Turkey.--A living adult of *Bruchus hamatus* Miller was intercepted at Washington, D. C., on January 15 in an unknown seed in baggage from Turkey. H. S. Barber reports as follows: "This is a very interesting addition to our collection, no sample having been available until now. It is one of the least known species of the genus and its host plant is unknown." On January 23 another living adult of this bruchid was taken at Washington, D. C., with seed of *Vicia* sp. in baggage from Turkey.

Weevil taken on pineapple.--A living adult of *Conotrachelus leucophaeatus* Fahr. was intercepted at Eagle Pass, Tex., on May 29, 1936, on a pineapple in cargo from Mexico. L. L. Buchanan states that this species is reported to breed in the stem of snow-on-the-mountain (*Euphorbia marginata*) and is recorded in the stem of *Amaranthus* sp. It ranges from Mexico and Texas northeastward as far as New Jersey.

Jamaican carries extensive food supply.--On the S. S. *Ulan* on May 13, Inspector J. H. Painter at New York intercepted from the baggage of one Jamaican passenger 25 pounds of yams from which 7 insect interceptions were taken; 85 mangoes infested with scale insects; 7 sweetpotatoes; and 52 nodes of sugarcane.

Pathological interceptions of interest.--N. Rex Hunt, who prepares the notes on pathological interceptions, is temporarily incapacitated by injuries resulting from an automobile accident. Mention of some of the more important interceptions will, therefore, be deferred for a time. *Ditylenchus dipsaci* (De Man) Filipjev was intercepted in *Hymenocallis calathina* from Holland at the Inspection House in mail on January 27. This represents our first interception of *D. dipsaci* in this host. *Helminthosporium* sp. and *Phyllachora* sp. on *Polytrias amaura* (lucknow grass, used as bedding and food for animals) from India, found at Savannah on March 25, constitute our first records for this host from India. The first interception of *Hendersonia grossulariae* Ouden on *Ribes* sp. from Norway was made March 5 at San Francisco from material found in mail. *Heterodera marioni* (Cornu) Goodey was found on *Aloe verecunda* and *Drimia haworthioides* from the Union of South Africa at

Washington on May 6. The *A. verecunda* and *Drimia* add a new species and genus respectively to the known hosts of this nema. The same nema was found in lettuce in stores from Haiti on March 2 at New York, thereby adding Haiti to the list of countries in which this pest occurs. *Phaeochora neowashingtoniae* (Shear) Theiss and Syd. was found on March 16 on palm leaf from Mexico in baggage at San Ysidro, Calif. This is a new interception record. *Phyllachora* sp. on *Cymbopogon citratus* from St. Vincent, British West Indies, found in mail at New York on January 26, is our first interception record for this host from that island. *Puccinia absinthii* D. C. was intercepted for the first time on leaf of *Artemesia absinthium* at New York on March 25, in mail from France. *Puccinia versicolor* Diet. and Holw. was intercepted on *Andropogon contortus* at El Paso from Mexico on March 11, our first interception record. Another new interception record for material from Argentina was made on May 19 at Philadelphia by the finding of *Septoria petroselini* Desm. on parsley. *Uredo ignava* Arth. was found on a leaf of *Bambusa* sp. (prob. *B. vulgaris*) in mail from Tobago, British West Indies, at New York on March 5, another new interception record.

DOMESTIC PLANT QUARANTINES

Phony peach inspection.--Field work has been concentrated since the beginning of the season on the inspection of environs of peach-growing nurseries in the infected States, as the major activity in the control of the disease. Orchard inspection will be started on the completion of nursery inspections. Under a well-organized force of over 100 Federal inspectors and approximately 20 State inspectors, inspection of nursery environs has been completed in Alabama and Mississippi and is in progress in Georgia, Tennessee, Texas, and Arkansas. To the close of May the environs of 118 nurseries covering 6,024 properties had been inspected and 88 properties were found infected. This type of inspection will be extended in June to Illinois, Missouri, Oklahoma, North Carolina, South Carolina, and Louisiana and during the season to the infected counties of Indiana, Kentucky, Maryland, and Pennsylvania.

State quarantines on phony peach disease standardized.--The quarantine committee of the Southern Plant Board in conference at Birmingham, Ala., on April 17 approved a draft of a phony peach disease quarantine which they recommended for uniform adoption by the various infected States. This standardized quarantine was accepted, we are informed, by officers of all States attending the conference, as well as certain other infected States. This quarantine requires certification as a condition of movement of host plants from the infected areas into, within, or from the State of origin. Such action, if taken by all infected States, affords equal protection to all peach-growing States and removes the necessity for quarantine action on the part of noninfected States. It also protects the accomplishments of the control program against reinfection because of intrastate or interstate shipments of exposed nursery stock to infected areas. The requirement of a disease-free zone of 1 mile around nurseries is retained, while the old provision for culling nursery stock for the peach borer, as an alternative condition of certification, is removed. Supplemental regulations have also been issued by the States of Georgia, Alabama, and Mississippi, declaring the phony peach disease a public nuisance. These measures greatly strengthen the control program, assure nurserymen of protection against diseased trees on neighboring properties, and simplify the problem of prompt removal of infected trees in orchards and home plantings in the course of regular inspection.

Destroying diseased trees effects control of peach mosaic.--Rapid and consistent reduction of the peach mosaic disease in the infected area in Mesa County, Colo., has been effected as a result of the prompt removal of all diseased trees during the last 2 years. Similar results are being accomplished in Utah. In the first round of Colorado inspection this season, the new cases numbered less than one-third those of last year and approximately one-ninth those of 2 years ago. Peach growers at Palisade, Colo., celebrated the accomplishments to date at a recent banquet and pledged themselves to the continuation of the campaign to a successful finish. In California the situation is less favorable where the 1936 inspection work was not begun until July, where only 45 percent of the diseased trees were removed and then after seasonal spread of the disease may have occurred. The 1937 inspections in that State show an increase of infection of from 50 to 500 percent over last year. Pending litigation is retarding eradication; however, cooperation under the circumstances is satisfactory and the outlook is encouraging. A force of 105 Federal inspectors and 28 State inspectors is at work in the infected States of Texas, New Mexico, Arizona, California, Colorado, and Utah. Infections around the affected States are, in the main, definitely localized and not generally distributed in any area. This, in view of the known rapidity of spread of the disease, indicates the infections were introduced rather recently, and lends encouragement to the practicability of eradication.

Citrus canker inspection.--Nearly 65,000 properties in 63 counties of 5 States have been inspected for citrus canker during the period from August 1935 to May 1937, such work having been conducted in the entire citrus-producing area of Texas, Louisiana, Alabama, and Mississippi. Over 26 million trees have been inspected. Worthless citrus trees numbering over 18 million have been removed from over 11,000 properties in these States. While several recurring infections of citrus canker have been found in recent months occurring on seedlings growing from sites where infected trees were removed during the last 2 years, the last new infection was located in Texas in August 1936 and only one new case has been found in Louisiana in this calendar year. A recent report of the abandoned tree-eradication project of the lower Rio Grande Valley in Texas, states that 98 percent of the abandoned citrus nursery stock which was growing in Cameron, Hidalgo, and Willacy Counties at the beginning of the work in 1935 has been removed. The owners had abandoned these nurseries, owing to the drought and depression of recent years and the stock was of no value. The eradication work has minimized the danger of outbreak of citrus canker and has given employment to 531 persons on relief. The project is now completed.

Transit inspection.--Inspectors report a heavier movement of nursery stock last spring than in recent years, with large numbers of shipments from greenhouses in the Ohio area recently brought under the regulations of the Japanese beetle quarantine. During the season transit inspection was carried on at 16 of the more important transfer centers throughout the United States. The regular inspection force was augmented by the assignment of 22 inspectors from other divisions of the Bureau and 15 State inspectors. This action, particularly by the several States, indicates considerable stimulation of interest in the value of transit inspection. Approximately 450 violations of Federal domestic quarantines were intercepted in May and approximately 1,450 in the period from January to May, inclusive. One of the shipments which was intercepted and returned by the New York inspectors contained Japanese beetle larvae. A transit inspection office has been established at Indianapolis, Room 425 of the Post Office and Courthouse Building having been assigned for the purpose. Work at this station is conducted on a part-time basis by W. R. Walton, Jr.

Inspection of five-leafed-pine nurseries.--Inspection of zones surrounding nurseries growing five-leafed pines for interstate shipment from blister-rust infected States is approaching completion in the Middle West and the Eastern States and is in progress in the Far West. Such inspection for any remaining wild or cultivated *Ribes* plants has followed closely the eradication work conducted under the supervision of the Division of Plant Disease Control, and is done as soon as the *Ribes* foliage leafs out in the respective regions before competing vegetation makes it difficult to find the currant and gooseberry plants. Seventeen Federal nurseries and nine State nurseries have applied for shipping permits. The Soil Conservation Service has eight such nurseries in six infected States and the Forest Service has nine in seven infected States. Commercial nurseries have applied for permits to ship pines from 16 States covering a range from Maine to Virginia and from the Middle Atlantic States west to Iowa and Minnesota.

Public conference on black stem rust.--A public conference is to be held on July 14 at 10 a. m. in the Department Auditorium to consider the advisability of extending the Federal grain-rust quarantine to include Missouri, Pennsylvania, Virginia, and West Virginia in the States for which permits must be obtained for shipping certain species of barberry and *Mahonia* to destinations therein. Under a recent revision of Circular B. E. P. Q. 385, *Berberis ottawensis* was removed from the permitted list of barberries.

INSECTICIDE INVESTIGATIONS

New form of paris green.--On May 11, 1937, the United States Patent Office granted F. E. Dearborn, of the Division of Insecticide Investigations, Patent No. 2080004, covering certain new compounds containing copper, arsenic, and organic acids. These new compounds are closely related to paris green in that the acetic acid of paris green is replaced by an unsaturated acid such as crotonic, oleic, and erucic. These new compounds are greenish in color. They are superior to ordinary paris green in that the water-soluble arsenic content is very low.

Arsenates of manganese.--All of the available information concerning the occurrence in nature, chemistry, methods of manufacturing, chemical and physical properties, and use as insecticides, of the various arsenates of manganese has been collected by F. E. Dearborn, of the Division of Insecticide Investigations, and published in mimeographed form as publication E-408. Although none of the manganese arsenates has come into extensive use as insecticides, this compilation will be helpful to those interested in testing new arsenicals."

BEE CULTURE

European foulbrood fails to recur in Caucasian and Carniolan colonies.--C. E. Burnside, of the Beltsville, Md., laboratory, reports that during May 1936, four colonies of Caucasian, four of Carniolan, and four of common black bees were inoculated with European foulbrood and about the same degree of infection resulted in all the colonies. Infection soon disappeared, however, from the Caucasian and Carniolan colonies but continued throughout the season in the common black bees. During spring brood rearing in 1937 the disease recurred in all the colonies of common black bees but did not recur in any of the Caucasian or Carniolan colonies. As European foulbrood usually recurs year after year in colonies of nonresistant bees, the fact that there was not a single recurrence among the Caucasian or Carniolan colonies at least indicates that these races show superiority, so far as resistance to European foulbrood is concerned.

Methods for standardized survival tests for adult honeybees.--A. W. Woodrow, of the Intermountain Bee Culture Field Laboratory, Laramie, Wyo., reports as follows: "It has been found that adult bees kept in cages in especially constructed cabinets and fed various foods under controlled temperature and relative humidity conditions, live from two to five times as long at 20-percent relative humidity as at 92-percent relative humidity, the temperature being 84.5° F., when salt solutions and wicks are used in the cabinets to control the relative humidity in uncirculated air. Sucrose solutions are more favorable to length of life than honey under these conditions. When water is available the bees live longer in the case of both foods. When a slow-moving fan is used to circulate the air in the cabinets, relative humidities of from 20 to 25 percent are almost as unfavorable for life as high relative humidities at the above temperature, and the bees live only a short time on normal honey, unless water is available. This difference is believed to be due to the large differences in the evaporation rate between nearly stagnant and circulated air. At all relative humidities the length of life seems shorter in circulated air than in nearly stagnant air."

IDENTIFICATION AND CLASSIFICATION OF INSECTS

Second record for an anobiid injurious to flooring.--In 1934 W. S. Fisher described as a new genus and new species Platybregmus canadensis, the specimens on which the description was based having been obtained at Arthur, Ontario, from maple flooring which was reported to be badly infested. Recently R. W. Leiby, of Cornell University, submitted for identification specimens from New York State (specific locality not mentioned), which have been determined by Mr. Fisher as the above species. The beetles were said to have ruined a floor in a house, being so abundant that half a cupful could be collected daily.

Rediscovery of a Fabrician species of Lepidoptera.--A small moth taken on grapefruit at Bayamon, P. R., and submitted for determination by the Division of Foreign Plant Quarantines, has been identified by August Busck as *Tinea minutella* F. This is a most interesting specimen, as it apparently represents the first capture of a moth belonging to this species since Fabricius published his original description in 1794 under the name *Alucita minutella*. The type was recorded as from the West Indies without more specific indication of locality.

An interesting lepidopterous record from the Olympic Mountains of Washington.--Annette F. Braun, of Cincinnati, Ohio, recently submitted to J. F. G. Clarke for determination an *Agonopterix* which she had reared in September 1936 from *Erigeron* sp. When the male genitalia were examined it became immediately apparent from the unique character of these organs that the specimens were *Agonopterix arnicella* Walsingham. In 1871 Lord Walsingham reared five specimens of this species taken on Mt. Shasta, Calif., supposedly from *Arnica angustifolia*, these constituting his type series. Two males of this series are in the U. S. National Museum collection. Sixty-five years have elapsed since the species was first discovered. One of Dr. Braun's specimens is a female, the only female of the species known in this country.

Indication of host association in the ichneumonid genus Hymenopharsalia.--The recent rearing of specimens of *Hymenopharsalia foutsi* Cushman from leaves of sumac infested by two lepidopterous leaf rollers, *Episimus argutanus* Clemens and *Gelechia* (*Pseudochelaria*) *walsinghami* Dietz, furnishes the first host record for any member of this anomalous ichneumonid genus. The material was collected in September 1936 at Germantown, Md., by Janet A. Breeden and Nettie E. Crocker, of this Bureau, and the insects, both hosts and parasite, emerged on May 19, 1937.

First female specimens of an interesting cicadellid.--Two females of *Krisna insularis* Oman have been received for determination from Luis F. Martorell, who collected them on El Yunque, Luquillo Forest, P. R. These specimens represent the first known record of the female sex of the species, which was described in 1936 from two males taken at the same locality and representing the first known American specimens of the genus.

Additions to the reference collections at the Museum.--William Schaus reports that among recent gifts of exotic Lepidoptera received, special mention should be made of approximately 100 species and forms of neotropical Sphingidae presented by B. Preston Clark, of Boston, Mass. Through the generosity of A. da Costa Lima, of Rio de Janeiro, Brazil, paratypes of a number of fruit flies of the genus *Anastrepha* not previously represented in our material were received for the collections of the National Museum. These will assist materially in the revision of this important group, which is now in progress.

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On the preservation of insect larvae.--A large part of the larval material submitted by various Bureau units and individuals for determination, for illustration, or for permanent preservation in the collections, is in very bad condition when received. Accordingly, it seems desirable to circulate, by means of the News Letter, certain simple directions for the preservation of such material. These directions are as follows:

All larvae should be killed in boiling water. In Diptera and Hymenoptera (except sawflies) the larvae should be dropped into the water after it has been removed from the flame and should remain in it from 3 to 5 minutes, depending on their size. For Lepidoptera, Coleoptera, and sawflies, the larvae should be dropped into the boiling water and allowed to boil vigorously for 1 minute or longer (as long as 5 minutes for the larger Lepidoptera). After having been killed and fixed by this means, the larvae should be transferred to vials completely filled with alcohol of not less than 75-percent strength, 95 percent being preferred for the larger Lepidoptera. Only new and well-fitting corks should be used. The following of this simple procedure will insure the satisfactory preservation of larval material.

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